Space Weather Forecast

Issued on Monday, 21 February 2022 at 00:43 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic Storms Day 1 (21 Feb), becoming Slight Chance Day 2 (22 Feb). Slight chance throughout of M-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with a single C-flare from over the NE limb. This perhaps from returning ex-2938 which was a likely source of a notable far-sided flare and coronal mass ejection on the 15th. There are four Earth-sided sunspot regions, however these are all small and simple at the present time. There was an eruption in the southeast disc, which has produced a Coronal Mass Ejection (CME). This is expected to miss Earth. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: The solar wind has indicated that we have been in the high speed stream from a coronal hole throughout. The wind speed has fluctuated between slightly elevated and elevated. The total magnetic field strength was initially moderate, but fell back to weak after 20/0200 UTC. The important north/south direction was initially mainly moderately southward, but became weak and more northward directed after 20/0200 UTC. Geomagnetic activity was Quiet to Active (Kp 0-4), with a single G1/Minor Storm (Kp 5) interval initially during 20/0000-0300 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained very slightly above background levels, but is gradually declining and well below the threshold for solar radiation storms. This was due to the large far sided flare from the region expected to rotate into view in the coming days.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low or Very Low at first, but with a slight chance of rising to Moderate through the four days due to the potential for flaring from one or more region(s) just starting to rotate onto the Earth-facing disc. The other three sunspot regions on the Earth-facing disc are currently unlikely to produce significant flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed coronal mass ejections. Earth is experiencing a high speed stream most likely from coronal hole 56, with this expected to persist during day 1 (21 Feb) and into day 2 (22 Feb), before gradually easing. Geomagnetic activity is expected to be Quiet to Active at first, with a chance of further G1/Minor Storm intervals. This is expected to steadily reduce through the next 24-48 hours, with mainly Quiet activity expected into days 3 and 4 (23 and 24 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to soon fall to background, with no solar radiation storms expected through the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	10	2	2
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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